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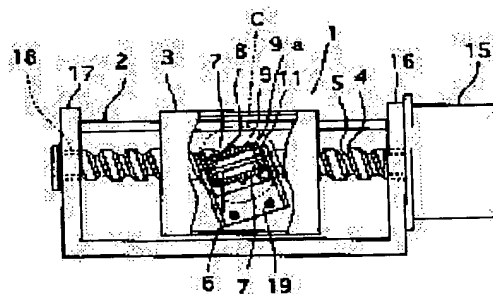
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(54) TABLE FEEDING MECHANISM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a table feeding mechanism of such a structure that a fitting member to be engaged by a drive shaft for feeding is mounted on a slide table and makes movement in rolling contact with the drive shaft.

SOLUTION: This table feeding mechanism concerned 1 is composed of a slide table 3 on which a fitting member 9a to be engaged by a drive shaft for feeding 4 is mounted and a guide shaft 2 for guidance in the moving direction parallel with the drive shaft 4, wherein the slide table 3 is moved with rotation of the drive shaft 4. The drive shaft 4 is formed in a single piece with the shaft of a motor 15, and a spiral screw groove 5 is formed at the periphery of the drive shaft 4 over the range where a moving member makes movement. The member 9a rotates a roller 9 having a fitting protrusion 8 at the periphery through bearings 7 furnished at the ends of a roller supporting shaft 6 which perpendicularly intersects the screw groove 5 in the shaft 4.



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CLAIMS

[Claim(s)]

[Claim 1] The table delivery mechanism carry out having constituted so that it may be moved an above-mentioned engagement member carrying out [while attaching the engagement member have the engagement section are engaged to the driving shaft for the above-mentioned delivery in the table delivery mechanism which constituted so that it may make move by rotation of the driving shaft for delivery which prepared the slide table guided with a guide shaft in parallel with an above-mentioned guide shaft to an above-mentioned slide table, prepare possible / rotation of an above-mentioned engagement member /, and] the rolling contact to the driving shaft for the above-mentioned delivery as

[Claim 2] It is the table delivery mechanism according to claim 1 which the above-mentioned driving shaft for delivery is equipped with a spiral slot or spiral heights as a mechanical component for delivery, and is characterized by for the above-mentioned engagement member to be what has the engagement section formed in the periphery of the roller formed free [rotation on the support shaft which intersects perpendicularly to the formation direction of the above-mentioned mechanical component for delivery, and this support shaft], and the above-mentioned roller which engages with the above-mentioned slot or heights.

[Claim 3] It is the table delivery mechanism according to claim 1 which is the position where two or more anchoring and two or more of these engagement members approached the above-mentioned engagement member mostly to the shaft orientations of the above-mentioned driving shaft for delivery at the above-mentioned slide table, and is characterized by preparing so that the above-mentioned driving shaft for delivery may be pinched.

[Claim 4] Two or more above-mentioned engagement members are table delivery mechanisms according to claim 3 characterized by being attached so that each engagement section may give the force of an opposite direction mutually to the above-mentioned driving shaft for delivery.

[Claim 5] ***** corresponding to the above-mentioned engagement member for the mechanical component for delivery of the above-mentioned driving shaft for delivery while attaching two or more above-mentioned engagement members in the above-mentioned slide table, the table delivery mechanism according to claim 2 characterized by preparing two or more above-mentioned engagement members so that the above-mentioned driving shaft for delivery may be pinched to the shaft orientations of the above-mentioned driving shaft for delivery in the almost same position.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to a table delivery mechanism applicable [other than the table delivery mechanism in which it is used for a finishing machine and an assembly machine] to the head carriage move mechanism of various information machines and equipment etc., concerning the table delivery mechanism to which a move member can be moved with a precision sufficient in a predetermined direction.

[0002]

[Description of the Prior Art] As a move means for moving a move member with a precision sufficient in a predetermined direction, there is a table delivery mechanism in which it is used for the head carriage of various information machines and equipment other than a finishing machine and an assembly machine. Among these, there is a head carriage move mechanism in which it is used for the recording device which performs record and reproduction by using a magnetic disk as a record medium, and by this mechanism, in order to perform record and reproduction to the floppy disk as a record medium, it is necessary to move head carriage with a sufficient precision. As a move means to which the conventional head carriage is moved, there are drawing 8 and a thing as shown in drawing 9, for example. Drawing 8 shows the side elevation for a mechanical component, drawing 9 shows drawing of longitudinal section of a part for a mechanical component, and a head carriage portion, and the portion in a punctiform circle shows the enlarged view of an important section above the direction of an arrow in each drawing. respectively. In drawing 8 and drawing 9, 38 is the head base material which makes the magnetic head which is not illustrated support, and it is from-cartridge-energized so that the point may always move to the point side of the head carriage 31. the guide to which 40 is a guide shaft to which it shows movement of the above-mentioned head base material 38, and the head base material 38 was formed in the head carriage 31 -- by inserting the above-mentioned guide shaft 40 in a hole 34, it is held free [movement on this guide shaft 40], and the move direction is guided with this guide shaft 40

[0003] 30 is the engagement pin which projected horizontally and was formed from the side by the side of the motor section of the head carriage 31, and this engagement pin 30 is engaging with the chassis 39 of the screw slot 36 formed in the delivery screw shaft 35 of the motor shaft 33, and the portion located in the side which counters. It is held when the state where the engagement pin 30 sent and it engaged with the screw slot 36 of the screw shaft 35 is ****(ed) by the portion to which the point of a flat spring 37 by which the end face section was fixed to carriage 31 with the screw 41 is located in the anti-chassis 39 side of the delivery screw shaft 35, namely, the resiliency by which the engagement pin 30 goes to the upper part of the head carriage 31 energized by the resiliency of the above-mentioned flat spring 37 -- the screw slot 36 of the delivery screw shaft 35 -- the from cartridge from a lower part -- it is engaged free [in-and-out] to the screw slot 36-like

[0004] If operation in the above-mentioned composition is explained, the step drive of the motor shaft 33 will be minutely carried out for every predetermined angle of rotation and the motor shaft 33 will rotate in the predetermined direction with rotation of a motor 32, the above-

mentioned engagement pin 30 can be moved in accordance with the shaft orientations of the motor shaft 33, and can move the head carriage 31 and the head base material 38.

[0005]

[Problem(s) to be Solved by the Invention] however -- as the move means to which the head carriage of these former is moved -- movement -- when the load of a member had to be light and a heavy load needed to be given, by a pin 30 sending, touch with the screw shaft 35 was lost, or the pin 30 sent, and it was to secede from the screw shaft 35 depending on the grade of a load Moreover, since the screw slot 36 was deleted by wear with the screw slot 36 which sent with the pin 30 and was established in the screw shaft 35 in the shape of V character, the crevice was generated between the pin 30 and the screw slot 36, and it had the trouble that backlash occurs and send by irregular wear of the screw slot 36, and caused the fall of precision or the life of a delivery mechanism became [**** / generating with / by vertical movement of a pin 30 / backlash] short. Moreover, it had produced the same un-arranging it as the above also by wear of a pin 30, the delivery mechanism concerning the above-mentioned move means -- setting -- the pressurization between a pin 30 and the screw slot 36 -- since neither the force nor a crevice was able to be adjusted, sufficient precision was not acquired, but it had further the fault of being restricted to the scope of the light load about [of a delivery mechanism] a self-weight

[0006] this invention tends to prevent wear of the engagement section and a screw slot, and tends to prevent the relief of the engagement section, and secession while it is made in view of the above-mentioned situation and loses the crevice between the engagement section and a screw slot. Moreover, while applying ***** and enabling it to send a table with a sufficient precision, it aims at a long-life life being obtained also according to a heavy load.

[0007]

[Means for Solving the Problem] Then, in order to attain the above-mentioned purpose, it sets to this invention. In the table delivery mechanism constituted so that the slide table guided with a guide shaft might be moved by rotation of the driving shaft for delivery prepared in parallel with the above-mentioned guide shaft it constitutes so that it may be moved, while attaching in the above-mentioned slide table the engagement member which has the engagement section which engages with the above-mentioned driving shaft for delivery, and it prepares possible [rotation of the above-mentioned engagement member] and the above-mentioned engagement member carries out the rolling contact to the above-mentioned driving shaft for delivery.

[0008] Moreover, in this invention, the above-mentioned driving shaft for delivery is equipped with a spiral slot or spiral heights as a mechanical component for delivery, and the above-mentioned engagement member constitutes the engagement section formed in the periphery of the support shaft which intersects perpendicularly to the formation direction of the above-mentioned mechanical component for delivery, the roller formed in this support shaft free [rotation], and the above-mentioned roller which engages with the above-mentioned slot or heights.

[0009] Furthermore, the thing established so that it may be the position where two or more anchoring and two or more of these engagement members approached the above-mentioned engagement member mostly to the shaft orientations of the above-mentioned driving shaft for delivery at the above-mentioned slide table in this invention and the above-mentioned driving shaft for delivery may be pinched, Moreover, while two or more above-mentioned engagement members are attached so that each engagement section may give the force of an opposite direction mutually to the above-mentioned driving shaft for delivery, and attaching two or more above-mentioned engagement members in the above-mentioned slide table ***** corresponding to the above-mentioned engagement member for the mechanical component for delivery of the above-mentioned driving shaft for delivery and two or more above-mentioned engagement members are constituted so that the above-mentioned driving shaft for delivery may be pinched to the shaft orientations of the above-mentioned driving shaft for delivery in the almost same position.

[0010]

[Embodiments of the Invention] Next, it explains based on the example which shows the gestalt

The 2nd example concerning this invention prepares two mechanical components for delivery of the driving shaft 4 for delivery, and it is the almost same position to the shaft orientations of the driving shaft 4 for delivery about the above-mentioned engagement member, and it prepares them so that the driving shaft 4 for delivery may be pinched while it attaches two rollers 21 which have the engagement protruding line section 20 other than a roller 9 which has the engagement protruding line section 8 for the above-mentioned engagement member to the slide table 3, as shown in drawing 5 and drawing 6. And the screw slot 25 is put side by side in the position which countered the screw slot 5 other than the screw slot 5 to the mechanical component for delivery of the driving shaft 4 for delivery. The balance of the force which acts between rollers 9 and 21 and the driving shaft 4 for delivery is obtained by this, and the bending moment in the driving shaft 4 for delivery is not generated. In addition, illustration of roller supporter material etc. is omitted in drawing.

[0017] Furthermore, drawing 7 explains the 3rd example concerning this invention. Drawing 7 is the side elevation having shown the important section of the table delivery mechanism concerning the 3rd example in the cross section. the 3rd example concerning this invention -- engagement -- a member -- what performs pressurization to 9a, without using a spring -- it -- drawing 7 -- setting -- the above -- pressurization -- a spring 10 -- replacing with -- the driving shaft 4 side for delivery of the roller support shaft 22 -- the screw slot 23 -- forming -- pressurization -- a nut 26 and pressurization -- a locknut 27 is screwed, where the shaft of the roller support shaft 22 is pressed in the direction of an arrow, it stops, and such a regular position -- [0018] which can secure a highly precise delivery mechanism by pressurization even if it gives a big load As mentioned above, although the example concerning this invention was explained concretely, this invention is not limited to the above-mentioned example, and can be variously changed within limits which do not deviate from the summary. for example, the above-mentioned example -- sending -- business -- the engagement with which the roller 9 which the spiral screw slot 5 is formed over the range to which the periphery section of a driving shaft 4 moves a move member, and has the engagement protruding line section 8 into this screw slot 5 is made to engage -- a member -- although it had 9a -- the screw slot 5 -- replacing with -- sending -- business -- the engagement protruding line section may be formed in the periphery of a driving shaft 4, and a slot may be Moreover, in the above-mentioned example, although the roller is made into one piece or two pieces as an engagement member, this roller may be set as three pieces or four pieces, and the number of the screw slots corresponding to it may also be set as three articles or four etc. articles.

[0019]

[Effect of the Invention] As explained above, the table delivery mechanism concerning this invention While attaching in a slide table the engagement member which has the engagement section which engages with the driving shaft for delivery By having constituted so that it might be moved, while it prepared possible [rotation of the above-mentioned engagement member] and an engagement member carried out the rolling contact to the driving shaft for delivery engagement -- the roller of a member -- sending -- business -- a device is not generated between the engagement protruding line section and a screw slot, without a screw slot being deleted by wear with the screw slot which came floating, did not secede from a driving shaft, and was established in the axial driving shaft for delivery in the shape of V character Furthermore, backlash, the backlash by irregular wear of a screw slot by vertical movement of the engagement section, etc. do not occur. Therefore, the delivery precision of a slide table improves, when it is very small delivery, precision reservation becomes easy and the life of a table delivery mechanism can be lengthened further, and it becomes possible to raise reliability. Furthermore, there is no loss in the driving force of the axial driving shaft for delivery, and a big thrust is obtained also with small driving force. moreover, pressurization -- since two or more engagement members can be adjusted by adjusting at once, the time which adjustment takes can be cut down and a maintenance becomes unnecessary over a long period of time Furthermore, it is not necessary to use parts, such as an expensive ball screw, and cost can be suppressed. [0020] The above-mentioned driving shaft for delivery is equipped with a spiral slot or spiral heights as a mechanical component for delivery. furthermore, the above-mentioned engagement

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of the operation in the table delivery mechanism of this invention to a drawing. Drawing 1 is the example of the table delivery mechanism concerning this invention, and is the partial cross-section side elevation which met the A-A line of drawing 2 which carried out notch ***** of the important section. the enlarged view of a portion in which having shown drawing 2 with the plan of drawing 1, and having shown drawing 3 among [a punctiform circle / C] drawing 1, and drawing 4 -- engagement -- a member -- it is the perspective diagram showing 9a [0011] The slide table 3 on which the move member was laid, and it attached [it was constituted so that it might move to a rectilinear, and] for fixing a move member, and the hole was prepared as the table delivery mechanism 1 concerning this invention was shown in drawing 1. It is constituted so that it may move by rotation of the guide shaft 2 which guides this slide table 3 in the move direction in parallel along with the driving shaft 4 for delivery, and the driving shaft 4 for delivery which formed the slide table 3 guided with the guide shaft 2 in parallel with the above-mentioned guide shaft 2.

[0012] The driving shaft 4 for delivery is formed in one with the driving shaft of the mho evening 15 attached in the frame 16. An other end side is attached in a frame 17 through bearing 18, and the spiral screw slot 5 is formed over the range to which the periphery section moves a move member. the engagement to which the roller 9 which has the engagement protruding line section 8 is made to engage with this screw slot 5 -- a member -- 9a attaches the roller support shaft 6 in the roller supporter material 11, and is attached in the slide table 3 with the screw 19 9a forms the roller support shaft 6 which intersects perpendicularly in the direction of this screw slot 5 in the screw slot 5 of the driving shaft 4 for delivery. the above-mentioned engagement -- a member -- A roller 9 is formed possible [rotation] through the bearing 7 prepared in the ends of this roller support shaft 6, engagement -- a member -- 9a -- sending -- business -- it constitutes so that it may be moved carrying out the rolling contact to a driving shaft 4, and the engagement protruding line section 8 which engages with the periphery of this roller 9 in the screw slot 5 is formed, and the engagement protruding line section 8 is made to engage with the screw slot 5

[0013] the pressurization according [as opposed to / the roller support shaft 6 / as the above-mentioned engagement member is shown in drawing 3] to a spring -- the spring 10 was made to penetrate and pressurization is given to bearing 7 namely, pressurization -- a spring 10 always gives a fixed pressure to the bearing 7 prepared in the roller support shaft 6, and a roller 9, and pressurization of the engagement protruding line section 8 which is the engagement section is carried out in the direction of arrow P engagement of as opposed to the screw slot 5 of the driving shaft 4 for delivery by this -- a member -- the pressure of 9a becomes uniform, adjustment is also simplified, and precision improves

[0014] If operation of the table delivery mechanism concerning this invention is explained in the above-mentioned composition If the driving shaft 4 for delivery rotates in the direction of Arrow R with rotation of a motor 15 When the spiral screw slot 5 moves in the direction of P, the engagement section follows this movement, and the roller 9 with which the engagement protruding line section 8 in an engagement state was formed moves, carrying out the rolling contact to the driving shaft 4 for delivery The slide table 3 attached in the roller supporter material 11 is moved.

[0015] since it is constituted as mentioned above if it is in the table delivery mechanism concerning this invention -- engagement -- the roller 9 of a member -- sending -- business -- a device is not generated between the engagement protruding line section 8 and the screw slot 5, without the screw slot 5 being deleted by wear with the screw slot 5 which came floating, did not secede from a driving shaft 4, and was established in the axial driving shaft for delivery in the shape of V character The delivery precision of the slide table 3 does not fall, therefore the life of the table delivery mechanism 1 seems furthermore, not to become short, without backlash and the backlash by irregular wear of the screw slot 5 by vertical movement of the engagement section occurring.

[0016] Next, drawing 5 and drawing 6 explain the 2nd example concerning this invention. The plan of the table delivery mechanism which shows the 2nd example which drawing 5 requires for this invention, and drawing 6 are the important section expansion perspective diagrams of drawing 5.

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member Since it has the engagement section formed in the periphery of the support shaft which intersects perpendicularly to the formation direction of the mechanical component for delivery, the roller formed in this support shaft free [rotation], and the roller with which the above-mentioned slot is engaged, while losing the crevice between the engagement section and a screw slot Wear of the engagement section and a screw slot is prevented and the relief of the engagement section, secession, etc. can be prevented. moreover, the thing established so that it might be the position where two or more anchoring and two or more of these engagement members approached the engagement member mostly to the shaft orientations of the driving shaft for delivery at the above-mentioned slide table and the above-mentioned driving shaft for delivery might be pinched -- a roller -- sending -- business -- the balance of the force which acts between driving shafts is obtained, and the bending moment in the driving shaft for delivery is not generated

[0021] Furthermore, by being attached so that each engagement section may give the force of an opposite direction mutually to the above-mentioned driving shaft for delivery, the balance of the force is obtained and two or more engagement members can prevent generating of the bending moment to the above-mentioned driving shaft for delivery. Since the load has balanced to the driving shaft for delivery by having prepared ***** corresponding to the above-mentioned engagement member for the mechanical component for delivery of the above-mentioned driving shaft for delivery, and two or more above-mentioned engagement members so that the above-mentioned driving shaft for delivery might be pinched to the shaft orientations of the above-mentioned driving shaft for delivery in the almost same position, the deflection of a shaft does not occur, but while attaching two or more engagement members in the above-mentioned slide table, even when it is a heavy load, precision can be maintained further again.

[Translation done.]

JAPANESE [JP,10-009359,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS
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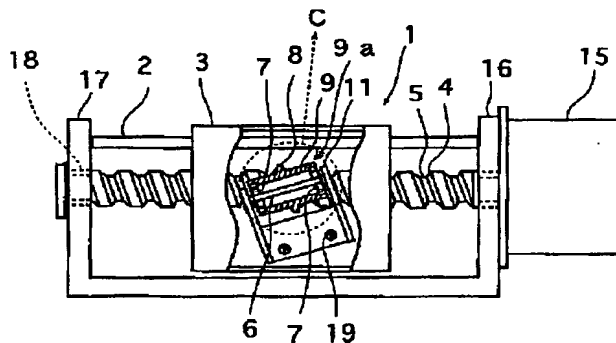
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(54) 【発明の名称】 テーブル送り機構

(57) 【要約】

【課題】 送り用駆動軸に係合する係合部材をスライドテーブルに取付けて、係合部材が送り用駆動軸に対して転がり接触をしながら移動するように構成する。

【解決手段】 テーブル送り機構 1 は、送り用駆動軸 4 と係合する係合部材 9 a が取付けられたスライドテーブル 3 と、送り用駆動軸 4 に沿って平行に移動方向に案内するガイド軸 2 からなり、スライドテーブル 3 を送り用駆動軸 4 の回転によって移動するように構成されている。送り用駆動軸 4 は、モータ 15 の駆動軸と一体的に形成され、送り用駆動軸 4 の外周部に移動部材を移動させる範囲にわたって螺旋状のネジ溝 5 が形成されている。係合部材 9 a は、送り用駆動軸 4 のネジ溝 5 に直交するローラ支持軸 6 の両端に設けた軸受 7 を介して、外周に係合凸条部 8 を有するローラ 9 を回転可能に形成している。



【特許請求の範囲】

【請求項1】 ガイド軸によって案内されるスライドテーブルを上記ガイド軸に平行に設けた送り用駆動軸の回転によって移動させるように構成したテーブル送り機構において、上記送り用駆動軸に係合する係合部を有する係合部材を上記スライドテーブルに取付けると共に上記係合部材を回転可能に設け、上記係合部材が上記送り用駆動軸に対して転がり接触をしながら移動されるように構成したことを特徴とするテーブル送り機構。

【請求項2】 上記送り用駆動軸は螺旋状の溝又は凸部を送り用駆動部として備えており、上記係合部材は、上記送り用駆動部の形成方向に対して直交する支持軸と、該支持軸に回転自在に設けられたローラと、上記溝又は凸部と係合する上記ローラの外周に形成された係合部とを有するものであることを特徴とする請求項1記載のテーブル送り機構。

【請求項3】 上記係合部材を上記スライドテーブルに複数取付け、該複数の係合部材は上記送り用駆動軸の軸方向に対しほぼ近接した位置であって上記送り用駆動軸を挟むように設けたことを特徴とする請求項1記載のテーブル送り機構。

【請求項4】 上記複数の係合部材は、それぞれの係合部が上記送り用駆動軸に互いに逆方向の力を付与するように取り付けられていることを特徴とする請求項3記載のテーブル送り機構。

【請求項5】 上記係合部材を、上記スライドテーブルに複数取付けると共に、上記送り用駆動軸の送り用駆動部を上記係合部材に対応する数設け、上記複数の係合部材を上記送り用駆動軸の軸方向に対しほぼ同じ位置で上記送り用駆動軸を挟むように設けたことを特徴とする請求項2記載のテーブル送り機構。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、移動部材を所定の方向に精度良く移動させることができるテーブル送り機構に関し、例えば加工機、組立機に用いられるテーブル送り機構の他に、各種情報機器のヘッドキャリッジ移動機構等にも適用可能なテーブル送り機構に関する。

【0002】

【従来の技術】 移動部材を所定の方向に精度良く移動させるための移動手段として、例えば加工機、組立機の他に、各種情報機器のヘッドキャリッジに用いられているテーブル送り機構がある。このうち、磁気ディスクを記録媒体として記録及び再生を行う記録装置に用いられているヘッドキャリッジ移動機構があり、この機構では、記録媒体としてのフロッピーディスクに対して記録及び再生を行うために、ヘッドキャリッジを精度良く移動させる必要がある。従来の、ヘッドキャリッジを移動させる移動手段としては、例えば図8及び、図9に示すようなものがある。図8は駆動部分の側面図、図9は駆動部

分及びヘッドキャリッジ部分の縦断面図を示し、各々の図において、点状円内の部分はそれぞれ矢印方向上方に要部の拡大図を示している。図8及び図9において、38は、図示しない磁気ヘッドを支持させるヘッド支持体で、常時その先端部がヘッドキャリッジ31の先端部側へ移動しようとするように弾発付勢されている。40は上記ヘッド支持体38の移動を案内するガイド軸であり、ヘッド支持体38は、ヘッドキャリッジ31に形成されたガイド孔34に上記ガイド軸40が挿通されることによって該ガイド軸40に移動自在に保持され、且つ、該ガイド軸40により移動方向を案内されるようになっている。

【0003】 30はヘッドキャリッジ31のモータ部側の側面から水平に突出して形成された係合ピンであり、該係合ピン30は、モータ軸33の送りネジ軸35に形成されたネジ溝36のシャース39と対向する側に位置する部分と係合されている。係合ピン30が送りネジ軸35のネジ溝36と係合された状態は、基端部がキャリッジ31にネジ41により固定された、板バネ37の先端部が、送りネジ軸35の反シャース39側に位置する部分に弾接されることによって、保持されている。即ち、係合ピン30は、上記板バネ37の弾発力によって付勢されたヘッドキャリッジ31の上方へ向かう弾発力によって、送りネジ軸35のネジ溝36に下方から弾発的に、且つネジ溝36に対して出入自在に係合されている。

【0004】 上記構成における動作を説明すると、モータ32の回転に伴ってモータ軸33は、所定の回転角毎に微細にステップ駆動され、モータ軸33が所定の方向に回転すると、上記係合ピン30はモータ軸33の軸方向に沿って移動することができ、ヘッドキャリッジ31及びヘッド支持体38を移動することができる。

【0005】

【発明が解決しようとする課題】 しかし、これら従来のヘッドキャリッジを移動させる移動手段としては、移動部材の負荷が軽くなければならず、重い負荷を与える必要がある場合に、負荷の程度によっては、ピン30が送りネジ軸35から浮き上がってしまったり、ピン30が送りネジ軸35から離脱することとなっていた。又、ピン30と送りネジ軸35に設けられたネジ溝36との摩擦により、ネジ溝36はV字状に削られるためピン30とネジ溝36との間に隙間が生じてしまい、ピン30の上下動によるガタ付きが発生したり、ネジ溝36の不規則な摩擦によってバックラッシュが発生して送り精度の低下を招いたり、送り機構の寿命が短くなるという問題点を有していた。又、ピン30の摩擦によっても上記と同様の不都合を生じていた。上記の移動手段に係る送り機構においては、ピン30とネジ溝36の間の与圧力や隙間を調節することができないため十分な精度が得られず、さらに、送り機構の自重程度の軽負荷の適用範囲に

限られるという欠点を有していた。

【0006】本発明は、上記事情に鑑みてなされたものであって、係合部とネジ溝との間の隙間をなくすと共に、係合部とネジ溝の摩耗を防ぎ、係合部の浮き上がりや離脱を防止しようとするものである。又、軽与圧を加えて精度良くテーブルを送れるようにすると共に、重い荷重によっても長寿命が得られることを目的とする。

【0007】

【課題を解決するための手段】そこで上記目的を達成するために、本発明においては、ガイド軸によって案内されるスライドテーブルを上記ガイド軸に平行に設けた送り用駆動軸の回転によって移動させるように構成したテーブル送り機構において、上記送り用駆動軸に係合する係合部を有する係合部材を上記スライドテーブルに取付けると共に上記係合部材を回転可能に設け、上記係合部材が上記送り用駆動軸に対して転がり接触をしながら移動されるように構成したものである。

【0008】また、本発明においては、上記送り用駆動軸は螺旋状の溝又は凸部を送り用駆動部として備えており、上記係合部材は、上記送り用駆動部の形成方向に対して直交する支持軸と、該支持軸に回転自在に設けられたローラと、上記溝又は凸部と係合する上記ローラの外周に形成された係合部とを構成したものである。

【0009】さらに、本発明においては、上記係合部材を上記スライドテーブルに複数取付け、該複数の係合部材は上記送り用駆動軸の軸方向に対しほぼ近接した位置であって上記送り用駆動軸を挟むように設けていること、また、上記複数の係合部材は、それぞれの係合部が上記送り用駆動軸に互いに逆方向の力を付与するように取り付けられており、上記係合部材を上記スライドテーブルに複数取付けると共に、上記送り用駆動軸の送り用駆動部を上記係合部材に対応する数設け、上記複数の係合部材を上記送り用駆動軸の軸方向に対しほぼ同じ位置で上記送り用駆動軸を挟むように構成したものである。

【0010】

【発明の実施の形態】次に、本発明のテーブル送り機構における実施の形態を、図面に示す実施例に基づいて説明する。図1は、本発明に係るテーブル送り機構の実施例で、要部を切欠いて示した図2のA-A線に沿った部分断面側面図である。図2は図1の平面図、図3は図1の点状円内Cで示した部分の拡大図、図4は係合部材9aを示す斜視図である。

【0011】本発明に係るテーブル送り機構1は、図1に示されるように、移動部材を載置して直線方向に移動するように構成され、移動部材を固定するための取付け孔が設けられたスライドテーブル3と、該スライドテーブル3を送り用駆動軸4に沿って平行に移動方向に案内するガイド軸2と、ガイド軸2によって案内されるスライドテーブル3を上記ガイド軸2に平行に設けた送り用駆動軸4の回転によって移動するように構成されてい

る。

【0012】送り用駆動軸4は、フレーム16に取り付けられたモータ15の駆動軸と一体的に形成され、他端側はベアリング18を介してフレーム17に取り付けられ、外周部は移動部材を移動させる範囲にわたって螺旋状のネジ溝5が形成され、該ネジ溝5に係合凸条部8を有するローラ9に係合させる係合部材9aが、ローラ支持軸6をローラ支持部材11に取り付けネジ19によってスライドテーブル3に取り付けられている。上記係合部材9aは、送り用駆動軸4のネジ溝5に該ネジ溝5の方向に直交するローラ支持軸6を設け、該ローラ支持軸6の両端に設けた軸受7を介してローラ9を回転可能に設け、係合部材9aが送り用駆動軸4に対して転がり接触をしながら移動されるように構成し、該ローラ9の外周にネジ溝5に係合する係合凸条部8を設けて、ネジ溝5に係合凸条部8に係合させている。

【0013】上記係合部材は、図3に示すように、ローラ支持軸6に対してスプリングによる与圧バネ10を貫通させて軸受7に対して与圧を与えている。即ち、与圧バネ10は、ローラ支持軸6に設けられた軸受7及び、ローラ9に対して常時一定の圧力を付与し、係合部である係合凸条部8は、矢印P方向に与圧されている。これによって、送り用駆動軸4のネジ溝5に対する係合部材9aの圧力が均一になり、調整も簡略化され精度が向上する。

【0014】上記の構成において、本発明に係るテーブル送り機構の動作を説明すると、モータ15の回転に伴って送り用駆動軸4が矢印Rの方向に回転すると、螺旋状のネジ溝5がP方向に移動し、この移動に係合部が追従して、係合状態にある係合凸条部8が形成されたローラ9が、送り用駆動軸4に対して転がり接触しながら移動することにより、ローラ支持部材11に取り付けられたスライドテーブル3を移動させている。

【0015】本発明に係るテーブル送り機構にあっては以上のように構成されているため、係合部材のローラ9が送り用駆動軸4から浮き上がってしまったり、離脱したりすることがなく、又、送り用駆動軸4に設けられたネジ溝5との摩耗によりネジ溝5がV字状に削られてしまうこともなく、係合凸条部8とネジ溝5との間に隙間が生じることもない。さらに、係合部の上下動によるガタ付きや、ネジ溝5の不規則な摩耗によるバックラッシュが発生することもなく、スライドテーブル3の送り精度は低下せず、従ってテーブル送り機構1の寿命が短くなるようなこともない。

【0016】次に、本発明に係る第2実施例を図5及び図6によって説明する。図5は本発明に係る第2実施例を示すテーブル送り機構の平面図、図6は図5の要部拡大斜視図である。本発明に係る第2実施例は、図5及び図6に示すように、上記係合部材をスライドテーブル3に対して、係合凸条部8を有するローラ9の他に係合凸

条部20を有するローラ21を2箇取付けると共に、送り用駆動軸4の送り用駆動部を2箇設け、上記係合部材を送り用駆動軸4の軸方向に対してほぼ同じ位置で、送り用駆動軸4を挟むように設ける。そして、送り用駆動軸4の送り用駆動部に対して、ネジ溝5の他にネジ溝5に対向した位置にネジ溝25を併設するものである。これによって、ローラ9及び21と送り用駆動軸4の間に作用する力のバランスが得られ、送り用駆動軸4における曲げモーメントは発生することがない。なお、図においてローラ支持部材等の図示は省略してある。

【0017】さらに、本発明に係る第3実施例を図7によって説明する。図7は、第3実施例に係るテーブル送り機構の要部を断面で示した側面図である。本発明に係る第3実施例は、係合部材9aに対する与圧をバネを用いずに行なうもので、図7において、上記与圧バネ10に代えてローラ支持軸22の送り用駆動軸4側にネジ溝部23を形成し、与圧ナット26及び与圧ロックナット27を螺合して、ローラ支持軸22の軸を矢印方向に圧した状態で止めネジ28で締め付けて矢印Q方向に与圧している。このような定位置与圧により、大きな負荷を

与えても高精度の送り機構が確保できる。

【0018】以上のように、本発明に係る実施例を具体的に説明したが、本発明は、上記実施例に限定されるものではなく、その要旨を逸脱しない範囲内で種々変更が可能である。例えば、上記実施例では送り用駆動軸4の外周部は移動部材を移動させる範囲にわたって螺旋状のネジ溝5が形成され、該ネジ溝5に係合凸条部8を有するローラ9に係合させる係合部材9aを有していたが、ネジ溝5に代えて送り用駆動軸4の外周に係合凸条部を形成し、係合部側に溝を形成してもよい。又、上記実施例では、係合部材としてローラは1箇又は2箇としているが、該ローラを3箇或いは4箇に設定し、それに対応するネジ溝の数も3条又は4条等に設定してもよい。

【0019】

【発明の効果】以上説明したように、本発明に係るテーブル送り機構は、送り用駆動軸に係合する係合部を有する係合部材をスライドテーブルに取付けると共に、上記係合部材を回転可能に設け、係合部材が送り用駆動軸に対して転がり接触をしながら移動されるように構成したことにより、係合部材のローラが送り用駆動軸から浮き上がってしまったり、離脱したりすることがなく、又、送り用軸駆動軸に設けられたネジ溝との摩擦によりネジ溝がV字状に削られてしまうこともなく、係合凸条部とネジ溝との間に隙間が生じることもない。さらに、係合部の上下動によるガタ付きや、ネジ溝の不規則な摩擦によるバックラッシュ等が発生することもない。従って、スライドテーブルの送り精度が向上し、微少送りの場合にも精度確保が容易になり、さらにテーブル送り機構の寿命を長くすることができ、信頼性を高めることが可能になる。さらに、送り用軸駆動軸の駆動力にロスがな

く、小さな駆動力でも大きな推力が得られる。又、与圧調整を一度行なうことにより複数の係合部材を調整できるため、調整に要する時間が削減でき、又、長期間にわたってメンテナンスが不要となる。さらに、高価なボールネジ等の部品を使用する必要がなく、コストが抑制できる。

【0020】さらに、上記送り用駆動軸は螺旋状の溝又は凸部を送り用駆動部として備えており、上記係合部材は、送り用駆動部の形成方向に対して直交する支持軸と、該支持軸に回転自在に設けられたローラと、上記溝が係合するローラの外周に形成された係合部とを有するものであるから、係合部とネジ溝との間の隙間をなくすると共に、係合部とネジ溝の摩擦を防ぎ、係合部の浮き上がりや離脱等を防止できる。又、係合部材を上記スライドテーブルに複数取付け、該複数の係合部材は送り用駆動軸の軸方向に対しほぼ近接した位置であって上記送り用駆動軸を挟むように設けたことにより、ローラと送り用駆動軸の間に作用する力のバランスが得られ、送り用駆動軸における曲げモーメントは発生することがない。

【0021】さらに、複数の係合部材は、それぞれの係合部が上記送り用駆動軸に互いに逆方向の力を付与するように取り付けられていることにより、力のバランスが得られ、上記送り用駆動軸に対する曲げモーメントの発生を防止できる。さらに又、係合部材を上記スライドテーブルに複数取付けると共に、上記送り用駆動軸の送り用駆動部を上記係合部材に対応する数設け、上記複数の係合部材を上記送り用駆動軸の軸方向に対しほぼ同じ位置で上記送り用駆動軸を挟むように設けたことにより、送り用駆動軸に対して、荷重がバランスしているため、軸の曲がりが発生せず、高負荷の場合でも精度を保つことができる。

【図面の簡単な説明】

【図1】本発明に係るテーブル送り機構の実施例で、要部を切欠いて示した図2のA-A線に沿った部分断面側面図である。

【図2】本発明に係るテーブル送り機構の平面図を示すものである。

【図3】図1の点状円Cで示した部分の拡大図である。

【図4】本発明の係合部材を示す斜視図である。

【図5】本発明に係る第2実施例を示すテーブル送り機構の平面図である。

【図6】図5の要部拡大図である。

【図7】本発明の第3実施例に係るテーブル送り機構の要部を断面で示した側面図である。

【図8】従来のテーブル送り機構における駆動部分の側面図である。

【図9】従来のテーブル送り機構における駆動部分及びヘッドキャリッジ部分の縦断面図を示すものである。

【符号の説明】

50 1 テーブル送り機構

7

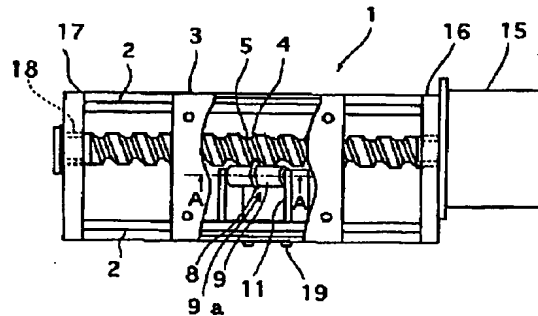
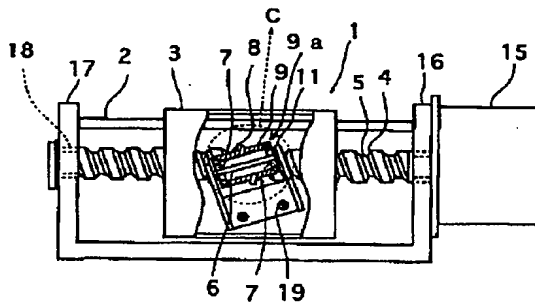
8

- 2 ガイド軸
- 3 スライドテーブル
- 4 送り用駆動軸
- 5 25ネジ溝
- 6 22ローラ支持軸
- 7 軸受
- 8、20 係合凸条部
- 9、21 ローラ
- 10 与圧バネ

- 11 ローラ支持部材
- 12 与圧リング
- 13 止めネジ
- 15 モータ
- 19 取付けネジ
- 23 ネジ溝部
- 26 与圧ナット
- 27 与圧ロックナット
- 28 止めネジ

【図1】

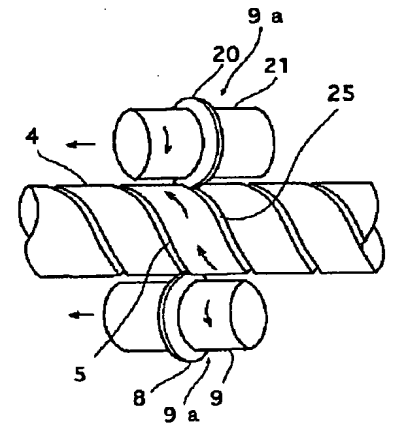
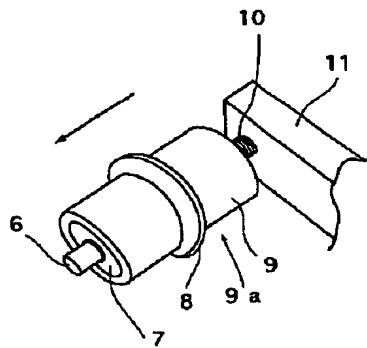
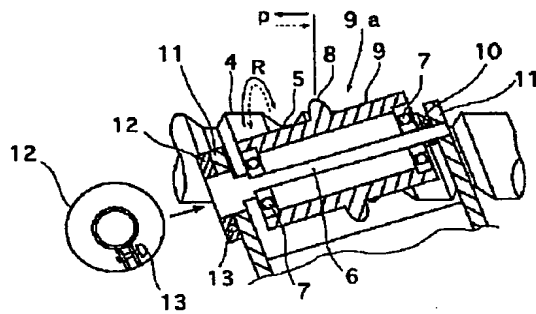
【図2】



【図3】

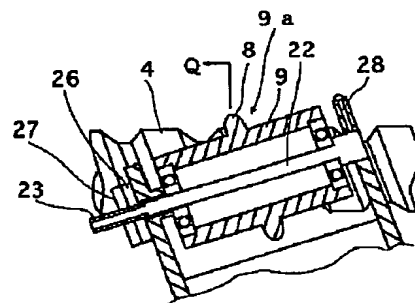
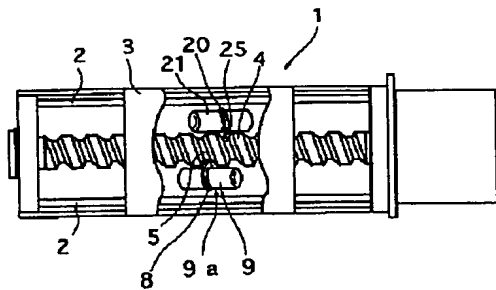
【図4】

【図6】

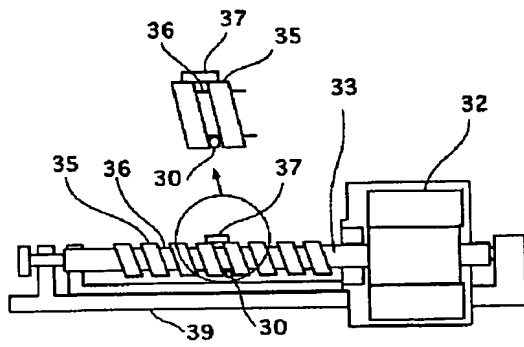


【図5】

【図7】



【図8】



【図9】

